



Box No. VIII (iv) DECLARATION: INVENTORSHIP (only for the purposes of the designation of the United States of America)
The declaration must conform to the following standardized wording provided for in Section 214; see Notes to Boxes Nos. VIII, VIII (i) to (v) (in general) and the specific Notes to Box No. VIII (iv). If this Box is not used, this sheet should not be included in the request.

Declaration of inventorship (Rules for the purposes of the designation o	s 4.17(iv) and 51bis.1(a)(iv)) f the United States of America:	
I hereby declare that I believe I am the original, first and sole (if only one inventor is listed below) or joint (if more than one inventor is listed below) inventor of the subject matter which is claimed and for which a patent is sought.		
and the discount to the interpretional application of which it forms a part (if filing declaration with application).		
This declaration is directed to international application No. PCT/.DK.00/.00088		
I hereby declare that my residence, mailing address, and citizenship are as stated next to my name.		
I hereby state that I have reviewed and understand the contents of the above-identified international application, including the claims of said application. I have identified in the request of said application, in compliance with PCT Rule 4.10, any claim to foreign priority, and I have identified below, under the heading "Prior Applications," by application number, country or Member of the World Trade Organization, day, month and year of filing, any application for a patent or inventor's certificate filed in a country other than the United States of America, including any PCT international application designating at least one country other than the United States of America.		
Prior Applications:		
I hereby acknowledge the duty to disclose information that is known by me to be material to patentability as defined by 37 C.F.R. § 1.56, including for continuation-in-part applications, material information which became available between the filing date of the prior application and the PCT international filing date of the continuation-in-part application.		
I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful follows the temperature may be observed the validity of the application or any patent issued thereon.		
Haraldsted. Hans H.		
Residence: Ellegaardspark 19. DK-3520 Farum, Definiark		
Fllegaardspark 19. Postbox	(107.	
(city and either US state, if applicable, or country) Mailing Address: Ellegaardspark 19, Posthor DK-3520 Farum, Denmark	\wedge	
Citizenship: Danish		
Inventor's Signature: (if not contained in the request, or if declaration is corrected or added under Rule 26ter after the filing of the international application. The signature must be that of the inventor, not that of	Date:28 Aug. 2001. (of signature which is not contained in the request, or of the declaration that is corrected or added under Rule 26ter after the filing of the international application)	
the agent)		
Name:		
Residence:		
(city and citner OS state, it appropriate		
Mailing Address:	· · · · · · · · · · · · · · · · · · ·	
	,	
■		
Inventor's Signature:	Date:	
the agent)		
	•	

DOODSYNH JOEGO

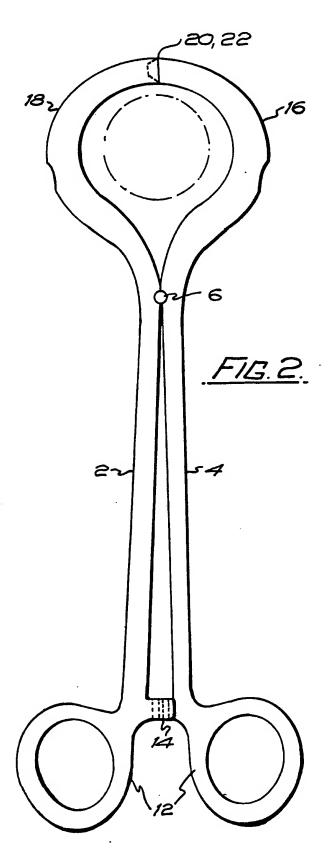
. !



PTO/SB/09 (12-97)
Approved for use through 9/30/00. OMB 0651-0031
Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

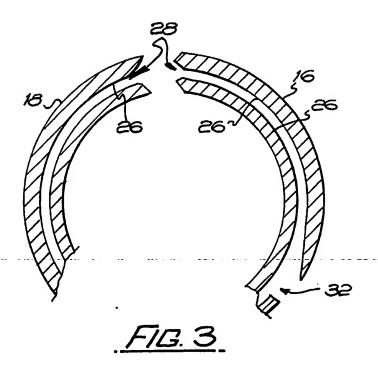
STATEMENT CLAIMING SMAI (37 CFR 1.9(f) & 1.27(b))-INDE		Docket Number (Optional)	
Applicant, Patentee, orldentifier. Hans H. Haraldsted			
Application or Patent No.: PCT/DK 00/00088			
Filed or Issued:			
Title: <u>Method and appar</u> liquid in an ult	atus for continuous homo rasound champer	genising of	
As a below named inventor, I hereby for purposes of paying reduced fees	y state that I qualify as an independent invento the Patent and Trademark Office describe	tor as defined in 37 CFR 1.9(c) ed in:	
x the specification filed herewith with title as listed above.			
x the application identified above.			
X the patent identified above.			
I have not assigned, granted, conveyed, or licensed, and am under no obligation under contract or law to assign, grant, convey, or license, any rights in the invention to any person who would not qualify as an independent inventor under 37 CFR 1.9(c) if that person had made the invention, or to any concern which would not qualify as a small business concern under 37 CFR 1.9(d) or a nonprofit organization under 37 CFR 1.9(e).			
Each person, concern, or organization to which I have assigned, granted, conveyed, or licensed or am under an obligation under contract or law to assign, grant, convey, or license any rights in the invention is listed below:			
No such person, concern, or organization exists.			
Each such person, concern, or organization is listed below.			
RESON A/S			
(A small firm with about 5o employees)			
Separate statements are required from each named person, concern, or organization having rights to the invention stating their status as small entities. (37 CFR 1.27)			
I acknowledge the duty to file, in this application or patent, notification of any change in status resulting in loss of entitlement to small entity status prior to paying, or at the time of paying, the earliest of the issue fee or any maintenance fee due after the date on which status as a small entity is no longer appropriate. (37 CFR 1.28(b))			
Hans H.Haraldsted			
NAME OF INVENTOR	NAMEOFINVENTOR	NAME OF INVENTOR	
Signature of inventor	Signature of inventor	Signature of inventor	
19 July, 2001 Date	Date	Date	

Burden Hour Statement: This form is estimated to take 0.2 hours to complete. Time will vary depending upon the needs of the individual case. Any comments on the amount of time you are required to complete this form should be sent to the Chief Information Officer, Patent and Trademark Office, Washington, DC 20231. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Assistant Commissioner for Patents, Washington, DC 20231.



6.

.



*

(

The invention relates to apparatus for passing a wire, suture or the like behind a bone or other obstacle during surgery.

Specifically, the invention relates to an appliance for use in orthopaedic surgery when it is required to surround a fractured bone with a tight loop of wire. In order to mimimise damage to surrounding tissue it is desireable to make an incision only to one side of the bone, and once the wire has been passed around the back of the bone it is a relatively simple matter to tighten the wire from the front. The problem which the invetion seeks to solve is that of passing the wire behind the bone in the first place.

According to the invention, therefore, there is provided surgical apparatus comprising means defining first and second wire guide elements, each having a wire inlet and a wire outlet, said elements being relatively movable between a first position, wherein the outlet of one element and the inlet of the other element are spaced apart for introduction, from the front of an obstacle such as a bone, respectively to the sides thereof, and a second position wherein the said inlet and outlet are capable of cooperating so that wire projecting from the outlet of the one element may enter the inlet of the other element.

Preferably the said inlet and outlet are juxtaposed in said second position, and the arrangement may be that the juxtaposition may occur centrally behind the bone.

Preferably again the elements are pivotally connected for said relative movement, and the apparatus may further comprise means for releasably securing the elements in said second position.

The guide elements may comprise tubular members and may be interchangeable in the sense that in each member the wire inlet may become an outlet and the outlet become an inlet.

Embodiments of the invention will now be described by way of example and with reference to the accompanying drawings showing one embodiment of which:-

Fig. 1 is a side view thereof in open condition

Fig. 2 is a side view thereof in closed condition

Fig. 3 is a detailed sectional view of a portion thereof.

As shown in the Figures the apparatus comprises a pair of elongate members 2, 4, crossed, scissor-like, and pivoted to one another at 6 where they cross. To one side of the pivot 6 they define a pair of jaws 8, 10 whilst to the other side of the pivot they terminate in a pair of handles 12.

Adjacent the handles the members are provided with projections 14 directed each towards the other. One face of each of the projections 14 has a saw-tooth configuration so that when the projections overlap, that is when the handles 12 are brought close together, the saw-teeth interlock.

(

The terminal portions 16, 18 of the respective jaws 8, 10 are tubes formed substantially into a similar semi-circle, so much so that when the ends 20, 22 are brought together, the tangent to the respective portions 16, 18 at the ends are parallel and in fact co-linear. The semi-circles are of such diameter as to be capable of surrounding a bone of the size which is required to be repaired. It will clearly be of advantage for the surgeon to have a range of instruments available of different sizes.

As shown in Fig. 1 the jaws 8, 10 are open wide enough to allow passage of a bone (shown in chain-dotted line) between the ends 20, 22, whilst in Fig. 2 the jaws are shown to be closed around the bone, with the ends 20, 22 in contact with one another. The whole instrument is made of surgical steel and this material has a considerable resilence so much so that if, after the ends 20, 22 have been brought into contact the handles 12 are brought even closer together, a compressive force will be exerted at the junction of the ends. The handles 12 are arranged to be retained in their close proximity by the overlapping of the projections 14 and the interlocking of their mutually-facing saw-toothed surfaces.

The tubes forming the portions 16, 18 open at the ends 20, 22, and the wall of each tube is cut away at 32 to provide access ports leading tangentially into the central bore 24 in the direction of the open end. It will be seen from Fig. 1 that the access ports 32 are substantially diametrically opposed to one another and are formed in the portion of the circumference of each tube facing away from the other.

As shown in the sectional view, Fig. 3, the inner wall 26 of each of the tubes 16, 18 is slightly chamfered so that the bore 24 of the tube is flared towards its open mouth 28. Between the edge of the mouth and the outer surface 30 each tube is evenly tapered to the same angle but in the opposite direction to the taper in the other. The results is that when the jaws are closed as in Fig. 2 the end 20 fits into the end 22, the taper ensuring complete alignment of the flared mouths of the bores of the respective tubes.

In use of the apparatus, the bone to be repaired is exposed by an incision from one side and, with the jaws open the ends 20 and 22 of the tubes 16 and 18 are introduced carefully to the respective sides of the bone and closed together behind the bone by operation of the handles 12. The handles are then brought even closer together so that the projections 14 interlock as explained above and the tapered ends 20, 22 interengage under compression.

One end of a suitable length of surgical wire is then entered into one of the tubes 16, 18 via the port 32 and passed in the direction of the mouth 28. The end of the wire is preferably rounded and this fact, combined with the parallelity of the tubes at their ends, the flaring of the mouths of the respective tubes and the precise alignment of the bores of the tubes, results in an assured passage of the end of the wire out of the said one tube and into the other. A further passage of the wire results in the rounded leading end passing along the other of the tubes, probably following the outer surface of the bore, until it reaches the further access port 32 where it exits from the tube in a direction substantially parallel to the length direction of the instrument.

The interlocking projections 14 are then released by moving the handles 12 relatively to one another perpendicularly to the plane of Fig. 1, the jaws are carefully opened and withdrawn past the sides of the bone and out of the incised opening, the wire sliding along the tubes 16, 18 and the free ends thereof eventually being released from the ends 20, 22 of the jaws. The free ends are then available for crossing towards the front of the bone, tightening and twisting tegether in the known surgical technique.

CLAIMS

- 1. Surgical apparatus comprising first and second wire guide elements, each having a wire inlet and a wire outlet spaced from one another, said elements being relatively moveable between a first position, wherein the outlet of one element and the inlet of the other element are spaced apart for introduction, from the front of an obstacle such as a bone to the respective sides thereof, and a second position, wherein the inlet and outlet are juxtaposed so that wire projecting from the outlet of the one element may enter the inlet of the other element.
- 2. Apparatus according to Claim 1 wherein the guide elements are tubes.
- 3. Apparatus according to Claim 1 or Claim 2 wherein the inlet of one element and the outlet of the other element are adapted to co-operate to facilitate the passage of wire therebetween.
- 4. Apparatus according to any one of the preceding claims wherein the elements are adapted to be releasably secured in the second position.
- 5. Apparatus according to any preceding claim wherein the elements are pivotally connected for said relative movement.
- 6. Surgical apparatus substantially as described with reference to the drawings.